

EXHIBIT A

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

VI TECHNOLOGIES, LLC,

Plaintiff,

v.

AEROTECH MAPPING, INC.

Defendant.

Civil Action No. 6:21-CV-00297-ADA

VI TECHNOLOGIES, LLC,

Plaintiff,

v.

MERRICK & COMPANY,

Defendant.

Civil Action No. 6:21-CV-00316-ADA

VI TECHNOLOGIES, LLC,

Plaintiff,

v.

WOOLPERT, INC.,

Defendant.

Civil Action No. 6:21-CV-00318-ADA

DECLARATION OF QASSIM A. ABDULLAH, PH.D., CP, PLS

I, Qassim A. Abdullah, declare:

1. I am the Vice President and Chief Scientist of Defendant Woolpert, Inc. ("Woolpert"). I have personal knowledge of the facts set forth in this declaration.
2. I received my Doctoral of Philosophy, Ph.D., in photogrammetry from the University of Washington in 1984.
3. I possess the knowledge, skills, experience, training, and education to form an expert opinion and testimony in this case. I am a scientist with 40 years of combined industrial, research, and academic experience in photogrammetry, remote sensing, and civil and surveying engineering, details of which are set forth in my curriculum vitae, which is attached to this declaration as Appendix A.
4. The facts upon which my opinions rely were perceived by or made known to me.
5. I understand that patents are understood from the perspective of a person of ordinary skill in the art at the time of the alleged inventions, which in this case includes the alleged inventions of U.S. Patent No. 7,127,348 ("the '348 Patent"), U.S. Patent No. 7,725,258 ("the '258 Patent"), U.S. Patent No. 8,483,960 ("the '960 Patent"), U.S. Patent No. 8,994,822 ("the '822 Patent"), and U.S. Patent No. 9,389,298 ("the '298 Patent"). I understand that, at all relevant times, I have been at least a person of ordinary skill in the art based on my education and experience.
6. In formulating my opinions in this matter, I have reviewed the '348, '258, '960, '822, and '298 Patents.
7. If called upon to do so, I would offer live testimony regarding the opinions in this declaration. In connection with live testimony in this proceeding, should I be asked to provide it, I may use as exhibits various documents that refer to or relate to the matters contained within this

declaration or that are derived from the results and analyses discussed in this declaration.

Additionally, I may create or supervise the creation of certain demonstrative exhibits to assist me in testifying.

8. Based on my knowledge and experience and my review of the '348, '258, '960, '822, and '298 Patents, it is my opinion that "elevation measurement unit" is neither a term of art for nor does it convey a special meaning to me for the alleged inventions of the '348, '258, '960, '822, or '298 Patents.

9. I am not aware of any known definitions for the term "elevation measurement unit." I also am not aware of any general or technical dictionaries that define that term. It is therefore my opinion that there are no known definitions for the term "elevation measurement unit" to a person of ordinary skill in the art for the '348, '258, '960, '822, and '298 Patents.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on January 12, 2022

A handwritten signature in blue ink, appearing to read 'Qassim A. Abdullah', is written over a horizontal line.

Qassim A. Abdullah

APPENDIX A

QASSIM A. ABDULLAH, Ph.D.

2900 S Quincy St, Suite 430, Arlington, VA 22206

301.346.7360 *Qassim.Abdullah@woolpert.com***40 YEARS OF PROFESSIONAL EXPERIENCE****EDUCATION****PhD**, Civil Engineering/Photogrammetry, 1984,
University of Washington, Seattle WA**MS**, Civil Engineering, 1980, University of
Washington, Seattle WA**BS**, Civil Engineering, University of Basrah,
Basrah, Iraq**CERTIFICATION**

ASPRS Certified Photogrammetrist, (#900)

Certified Photogrammetric Surveyor, S.C.
(#22962)Registered Professional Photogrammetrist, Ore.
(#79002RPP)Professional Surveyor and Mapper, Fla. (#LS-
6665)Professional Surveyor Photogrammetrist, Va.
(#000038)Certified Thermographer, Infrared Training
Center (#85569)USGIF Certified GEOINT Professional in
Remote Sensing and Imagery Analysis (CGP-R)
(#0028)**HONORS AND AWARDS**

ASPRS "Lifetime Achievement Award" 2019

ASPRS "Fellow", 2017

ASPRS "Outstanding Service Award," 2017

ASPRS "Presidential Citation Award" 2015

ASPRS "Outstanding Workshop Instructor
Award," 2012ASPRS "Fairchild Photogrammetric Award,"
2010**AFFILIATIONS**American Society of Photogrammetry and
Remote Sensing (ASPRS), *Fellow*National Society of Professional Surveyors
(NSPS), *Member*American Society of Civil Engineers (ASCE),
*Member*Transportation Research Board (TRB), *member of*
"Standing Committee on Geospatial Data Acquisition
Technologies in Design and Construction – (AKD70)"
and "Standing Committee on The New Users of Shared
Airspace Committee (AV095)"**PROFILE**

Dr. Qassim Abdullah is an accomplished scientist and a thought leader with more than 40 years of combined industrial, research and development, and academic experience in analytical photogrammetry, digital remote sensing, and civil and surveying engineering.

Throughout his career, Dr. Abdullah has contributed significantly toward the advancement of digital aerial imagery and LiDAR acquisition and production processes. Among his accomplishments, Dr. Abdullah developed proprietary software applications for digital orthophotography and DEM production; developed and integrated a metric digital aerial camera for rapid image acquisition; integrated airborne GPS into conventional aerial triangulation adjustments; refined inertial navigation systems and GPS technology for position and orientation measurement; and developed integrated airborne GPS, inertial measurement, LiDAR data acquisition and precise positioning algorithms and processes.

As a civil engineer, ASPRS-certified photogrammetrist and professional surveyor in four states, Dr. Abdullah currently serves as Vice President and Chief Scientist at Woolpert, Inc. He is responsible for designing and managing strategic programs to develop and implement new remote sensing technologies that allow Woolpert to meet the evolving needs of geospatial users. Most recently, Dr. Abdullah has been involved in the calibration and processing of data from the single photon counting LiDAR and leading Woolpert's research activities in the field of unmanned aerial system (UAS) including sensor calibration and workflow.

Dr. Abdullah obtained his bachelor's degree in civil engineering from the University of Basrah in Iraq, and his master's degree and doctorate degrees in photogrammetry from the civil engineering department at the University of Washington in Seattle. He is affiliated with many national and international professional societies, is a published author of more than 50 technical papers and reports and is a sought-after professional speaker and educator. Besides publishing the monthly column "Mapping Matters," which appears in the ASPRS journal *PE&RS*, he is involved in several national committees. As a member, he participates in discussions regarding the industry's forecast, future geospatial technology, process improvements for LiDAR and digital photogrammetry, and accuracy standards.

Dr. Abdullah is the recipient of several prestigious awards from ASPRS such as Fairchild Photogrammetric Award, ASPRS fellow, the Presidential Citation Award for his role as co-author of the new ASPRS *Positional Accuracy Standards for Digital Geospatial Data*, and most recently the Lifetime Achievement Award. Dr. Abdullah is also an adjunct professor at The University of Maryland, Baltimore County, Shady Grove Campus and Pennsylvania State University teaching graduate courses on photogrammetry, remote sensing, GIS and UAS. Dr. Abdullah is a certified photogrammetrist by ASPRS and licensed professional surveyor and mapper with the states of Florida, Oregon, Virginia, and South Carolina. He is also a certified thermographer by the FLIR Infrared Training Center and a Certified GEOINT Professional in Remote Sensing and Imagery Analysis (CGP-R) by the United States Geospatial Intelligence Foundation (USGIF).

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PROFESSIONAL EXPERIENCE SUMMARY

2012-present **Woolpert, Inc.**, Arlington, Va., *Vice President and Chief Scientist*
 1994-2012 **Fugro EarthData Inc**, Frederick, Md., *Chief Scientist*
 2014-present **Pennsylvania State University**, State College, Pa., *Adjunct Professor*
 2009-present **University of Maryland Baltimore County**, Baltimore, Md., *Adjunct Professor*
 1993-1994 **Orthographics, Inc.**, Bothell, Wash., *Vice President*
 1991-1994 **Degross Aerial Mapping**, Bothell, Wash., *Photogrammetrist*
 1990-1991 **College of Engineering, Civil Engineering Department**, Baghdad, Iraq, *Associate Professor*
 1984-1990 **The Space Research Center, Scientific Research Council**, Baghdad, Iraq, *Department Head and Research Scientist*
 1978-1984 **University of Washington**, Seattle, Wash., *Research Engineer and Graduate Student*
 1976-1978 **Department of Planning and Construction**, Baghdad, Iraq, *Associate Site Engineer*

PUBLICATIONS

"Reliability Aspects and Data Rejection in X-ray Photogrammetry," PhD dissertation, University of Washington, June 1984
 "Analysis of a New Control System Model for Analytical X-ray Photogrammetry," master's thesis, University of Washington, 1980
 "Mapping Matters, Your Questions Answered, the layman's perspective on technical theory and practical applications of mapping and GIS," ASPRS' *PE&RS*, reoccurring monthly
 "Evaluation of Single Photon and Geiger Mode Lidar for the 3D Elevation Program," the Remote Sensing Journal, 2016, 8(9), 767; (<http://www.mdpi.com/2072-4292/8/9/767/html>)
 "Emerging Sensors Technologies for Geospatial Data Production and transportation Project Needs", TRB 98th Annual Meeting, Washington, D.C., January 13-17, 2019
 "Reality Capture: UAS-LiDAR State of the Practice", TRB 98th Annual Meeting, Washington, D.C., January 13-17, 2019
 "National Academic Programs and UAS Education at Penn State World Campus", TRB 98th Annual Meeting, Washington, D.C., January 13-17, 2019
 "Harnessing UAS products the photogrammetric way", TRB 98th Annual Meeting, Washington, D.C., January 13-17, 2019
 "Photogrammetric Approach to Aerial Thermal Survey," ASPRS Annual Convention, Tampa, Fla., May 2015
 "Woolpert's Unmanned Airborne System for Today's Mapping Needs: The Metric Approach," CaGIS/ASPRS Specialty Conference, San Antonio, Texas, Oct. 28, 2013
 "Airborne infrared thermography for environmental and facility management of the army national guard training Facilities" ASPRS Pecora 18, Herndon, Virginia., November 14 – 17, 2011
 "On the Quality of Contour Modeling Using LiDAR Data Versus Photogrammetrically-derived Solution," ASFPM Orlando, Fla., June 12, 2009
 "New Approach for Automatic Dodging of Push-broom Digital Aerial Imagery," ASPRS Annual Convention, San Diego, Calif., April 2010

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- "On the Quality of Contour Modeling Using LiDAR Data Versus Photogrammetrically-derived Solution," ASFPM Orlando, Fla., June 12, 2009
- "An Analysis of LiDAR-derived Versus Photogrammetrically-derived Contours," the ASPRS Annual Convention, Baltimore, Md., March 2009
- "Shedding New Light on LiDAR Data," *Earth Imaging Journal*, Jan./Feb. 2009
- "On the Quality of Contour Modeling Using LiDAR Data," ILMF proceedings, New Orleans, La., Jan. 2009
- "On the Accuracy of Push Broom Aerial Digital Camera," ASPRS Annual Conference, Tampa, Fla. May 7-11, 2007
- "Chapter 9," 5th edition of the manual *Photogrammetry* published by ASPRS, 2004
- "Camera Orientation Without Aerotriangulation: System Performance and Productivity," XIX Congress of the International Society for Photogrammetry and Remote Sensing (ISPRS) proceedings, Amsterdam, Netherlands, July 2000
- "Integrated GPS-Inertial Solution as an Alternative to Aerial Triangulation: Case Study" ASPRS Annual Conference proceedings, Portland, Ore., 1999
- "Airborne Infrared Thermography for Detection of Moisture Damage on Built-up Roofs" ASPRS Annual Conference proceedings, Portland, Ore., 1999
- "Toward Successful Airborne GPS Assisted Aero triangulation," GIS/LIS Annual Conference and Exposition, Fort Worth, Texas, Nov. 1998
- "Integrated Inertial/GPS for Direct Camera Attitude and Position Measurement as an Alternative to Aero-Triangulation," Geographic Information Systems Conference, Towson University, Towson, Md., June 1998
- "State of Art in Airborne GPS-controlled Aerial Triangulation: Learned Lessons," Tri-Service CADD/GIS/FM Symposium and USACE/NOAA Surveying, Mapping and Remote Sensing Conference, St. Louis, Miss., August 1997
- "Evaluation of GPS and Inertial Navigation System for Airborne Photogrammetry," Softcopy Photogrammetry Applications: Using the Tools proceedings, ASPRS/MAPPS, Arlington, Va., 1997
- "Control Requirements for Single Strip Block Airborne GPS Triangulation," CSM-ASPRS proceedings, Seattle, Wash., 1997
- "Data Collection in the 21st Century," International Public Works Congress and Exposition, Minneapolis Minn., September 1997
- "High-Performance Inertia Navigation and GPS Systems as an Alternative for Aerial Triangulation," Pennsylvania Geographic Information Systems Conference, Harrisburg, Pa., 1997
- "The future of 'On the Fly' GIS: Achievements and Challenges," IMAGIN Forum, Lansing Miss., May 1997
- "Digital Auto Correlation Versus Large-Scale Mapping in Photogrammetry," ASPRS-ACSM proceedings, Baltimore, Md., 1996
- "Digital Elevation Modeling for the New Sculpture at the National Shrine Using Close-range Photogrammetry," ASPRS-ACSM proceedings, Baltimore, Md., 1996
- "Evaluation of Digital Cameras for Photogrammetric Mapping," *International Archives of Photogrammetry and Remote Sensing*, Vol. XXXI, Part B1, Vienna, Austria, July 1996
- "Evaluation of Digital Cameras for Photogrammetric Mapping," The Second International Airborne Remote Sensing Conference and

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- Exhibition (ERIM) proceedings, San Francisco, Calif., June 24-27, 1996
- "Spectral Reflectance of Economically Important Rock Formations in the Western Desert of Iraq," ASPRS/ACSM/RT Convention proceedings, Washington, DC, Aug. 3-8, 1992
- "A Modern Approach For Studying Green Belt Policies in Large Metropolitan Areas," Proceedings, 1992 ASPRS/ACSM/RT Convention, Washington DC, August 3-8, 1992
- "An Early Warning System Against Natural Catastrophes Based on Remote Sensing Images and Meteorological Data," Technical report, Ministry of Planning, 1989
- "Geological Application of SIR-A Imagery in Southern Iraq," ACSM-ASPRS, St Louis Mo., 1988
- "Comparison of Shuttle Imaging Radar and LANDSAT Imagery in Mapping Natural Features in Southern Iraq," ACSM-ASPRS, St. Louis Mo., 1988
- "Feasibility Study for the National Geographic Information System: Phase 1: Natural Resources," Technical report, Ministry of Planning, 1988
- "Feasibility study for GIS for the Municipality of Baghdad," Technical report, Municipality of Baghdad, 1987
- "Effect of Some Parameters on Reflectance Measurement in Remote Sensing," *Journal of Space and Astronomy Research*, No. 2, August 1987
- "A National Fifteen-year Plan for Technology Transfer in Remote Sensing, GIS Photogrammetry and Surveying," Technical report, National Committee on Technology Transfer, Scientific Research Council, 1986
- "Future of Remote Sensing Applications and Technology," First National Symposium on Remote Sensing, Baghdad, 1985
- "Simplified Mathematical Model for Application of Analytical X-ray Photogrammetry," International Society of Photogrammetry, Hamburg, Germany, July 1980 and Photogrammetric Engineering, May 1981
- "Investigation into the Geometry of X-ray Photogrammetry," unpublished paper
- "Two-dimensional versus Three-dimensional X-ray Photogrammetry," unpublished paper

COURSES AND WORKSHOPS TAUGHT BY Dr. ABDULLAH

- "Geospatial Applications of The Unmanned Aerial System (UAS)-GEOG892," Pennsylvania State University, graduate semester-based course, offered semi-annually since 2014
- "GIS Data Sources, Tasking and Acquisitions – GES776," University of Maryland – Baltimore County (UMBC), graduate semester-based course, offered annually since 2007
- "Remote Sensing Systems Technology and Applications – GES770," University of Maryland – Baltimore County (UMBC), graduate semester-based course, offered annually since 2012
- "Unmanned Aerial System Technologies and Geospatial Products Generation GES-679," University of Maryland – Baltimore County (UMBC), graduate semester-based course, offered annually since 2018
- "Geospatial Data Quality and Accuracy: The State-of-the-Practice", half day workshop, Alaska Surveying & Mapping Conference Anchorage, AK, Feb 13-15, 2019
- "Emerging Lidar and Imaging Sensors Technologies for Surveying and Mapping Business", GeoJam session, Alaska Surveying & Mapping Conference, Anchorage, AK, Feb 13-15, 2019

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- “**Practical Approach to Using the new ASPRS Positional Accuracy Standards for Digital Geospatial Data**”, half day workshop, ASPRS 2018 & 2019 Annual Conferences, Denver, CO, February 2018 and January 2019
- “**Aerial Triangulation and Data Processing for the Unmanned Aerial System (UAS)**”, half day workshop, ASPRS 2018 & 2019 Annual Conferences, Denver, CO, February 2018 and January 2019
- “**Understanding Mapping Products Accuracy and Quality According to ASPRS Positional Accuracy Standards for Digital Geospatial Data**”, half day workshop, Alaska Surveying & Mapping Conference Anchorage, AK, Feb 12-16, 2018
- “**Impacts of New Capabilities and New Rules on Integrating UAS into Day-to-Day Use, Parts 1 & 2**”, Full day workshop, TRB 98th Annual Meeting, Washington, D.C., January 13-17, 2019
- “**Imagery Triangulation and Sensor Calibration for Manned and Unmanned Aerial Systems – PART-I**”, half day workshop, ASPRS 2017 Annual Conference, Baltimore, MD, March 2017
- “**Imagery Triangulation and Sensor Calibration for Manned and Unmanned Aerial Systems – PART-II**”, half day workshop, ASPRS 2017 Annual Conference, Baltimore, MD, March 2017
- “**The State of Technologies for the Geospatial Mapping Industry**”, Two hours short course, NGA College, the National Geospatial-Intelligence Agency (NGA) Springfield, VA, May 11, 2016
- “**Innovations in Airborne Lidar and Geospatial Technologies**”, half day workshop, 2016 Symposium, MidAmerica GIS Consortium, Highland Park, KS, April 28, 2016
- “**Calibrating Film and Digital Sensors for Today’s Remote Sensing Business**”, half day workshop, IGTF 2016 ASPRS Annual Conference, Ft. Worth, TX, April 11-15, 2016
- “**Lidar Data Accuracy**”, half day workshop, IGTF 2016 ASPRS Annual Conference, Ft. Worth, TX, April 11-15, 2016
- “**UAS Data Processing**”, half day workshop, ASPR/UAS conference, Reno, NV, September 28, 2015
- “**Advances in Geospatial Mapping Technologies to Serve Defense and Home Land Security**”, Two hours short course, NGA College, the National Geospatial-Intelligence Agency (NGA) Springfield, VA, July 21, 2015
- “**Calibrating Film and Digital Sensors for Today’s Remote Sensing Business**”, half day workshop, The National Geospatial-Intelligence Agency (NGA) Springfield, VA, June 30, 2015
- “**GPS-based Aerial Triangulation for Imaging Sensors Orientation**”, full day workshop, ASPRS 2015 Annual Conference, Tampa, FL, May 6, 2015
- “**Advances in Geospatial Mapping Technologies to Serve Defense and Home Land Security**”, Two hours short course, NGA College, the National Geospatial-Intelligence Agency (NGA) Springfield, VA, January 29, 2015
- “**GPS-based Aerial Triangulation for Imaging Sensors Orientation**”, ASPRS 2014 Annual Conference, full day workshop, Louisville, KY, March 24, 2014
- “**Calibrating Film and Digital Sensors for Today’s Remote Sensing Business**”, half day workshop, ASPRS 2013 Annual Conference, Baltimore, MD, March 24-28, 2013
- “**QA/QC Processes and Concepts**”, CaGIS/ASPRS Specialty Conference, half day workshop, San Antonio, Texas, Oct. 28, 2013

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"**LiDAR Fundamentals and Applications**," ASPRS, four-hour mini webinar, December 2009 and March 2011.

"**GPS-based Aerial Triangulation for Imaging Sensors Orientation**" ASPRS full-day workshop, 2004-15 (excluding 2005)

"**Calibration of Digital and Film Sensors**" ASPRS Fall convention, half-day workshop, Orlando, Fla., 2011

"**Photogrammetry for Dummies or Photogrammetry 101**," one-day workshop offered as internal staff training for Fugro EarthData staff, Frederick, Md., 2005-09

"**Review of Photogrammetry and Mapping Sciences**," two-day workshop offered as internal staff training for Fugro EarthData staff, Frederick, Md. 2006-10 (excluding 2009)

"**LiDAR Fundamentals and Applications**," Towson University Annual GIS Conference, half-day workshop, Baltimore, Md., 2007 and 2009

"**LiDAR Fundamentals and Applications**" MASSGIS and New England URISA, half-day seminar, Conn. and Mass., April 2009

"**Digital Mapping Camera Systems: Owners' Perspective**," ASPRS Annual Conference, panel organized and moderated by Dr. Abdullah, Tampa, Fla., May 7-11, 2007

"**Digital Mapping Camera Technologies and Applications**," ASPRS, a panel organized and moderated by Dr. Abdullah, Baltimore, Md., 2009

"**Airborne Digital Mapping**," CRSS/ASPRS Specialty Conference titled, "**Our Common Borders**," panel organized and moderated by Dr. Abdullah Ottawa, Canada, Oct. 28-Nov. 1, 2007

"**LiDAR, Photogrammetry, and Orthophoto**," Southwest Florida Water Management District, two-day training course for staff, Sep. 10-11, 2007

"**Airborne GPS-controlled Aerial Triangulation: Theory and Practical Concepts**," A full day workshop offered during the ASPRS Annual Convention and Exhibition, Anchorage, Ala., May 2003

"**Airborne GPS-controlled Aerial Triangulation: Theory and Practical Concepts**," A full day workshop offered during the ASPRS Annual Convention and Exhibition, Washington, D.C., April 2002

"**Airborne GPS-controlled Aerial Triangulation: Theory and Practical Concepts**," A full day workshop offered during the ASPRS Annual Convention and Exhibition, St. Louis, Mo., April 2001

"**Airborne GPS-controlled Aerial Triangulation: Theory and Practical Concepts**," A full day workshop offered during the ASPRS/ACSM Practical Applications in the Geospatial Information Sciences Conference, Providence, R.I., Dec. 2000

"**Airborne GPS-controlled Aerial Triangulation: Theory and Practical Concepts**," A full day workshop offered during the ASPRS Annual Convention and Exhibition, Washington, D.C., May 2000

"**Airborne Remote Sensing for GIS Base Mapping**," Esri International Users Conference, San Diego, Calif., July 1999

"**State of the Art in the Mapping Sciences**," Esri International Users Conference, San Diego, Calif., July 1998

"**Remote Sensing and Image Processing**," Center for Environmental Studies, VCU, Richmond, Va., Aug. 1998

"**New Technologies for Surveying and Mapping**," GeoTech: The Annual Technical Conference of the Potomac Region of ASPRS, Silver Spring Md., 1998

"**Airborne GPS-controlled Aerial Triangulation: Theory and Practical Concepts**," ACSM-ASPRS Annual Convention and Exhibition, Seattle Wash., 1997

"**Introductions and Fundamentals of Mapping**," GeoTech: The

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Annual Technical Conference of the Potomac Region of ASPRS, Silver Spring Md, 1997

"Advanced Mapping Techniques and GIS Data Base Development Workshop," USACOE, St. Louis Mo., June 1997

"ABGPS Assisted Triangulation," The First National Symposium on Airborne GPS Public and Private Sector Activities, USGS/NMD and MAPPs, Reston Va., Feb. 1997